Remarks

General:

Claims 25-46 are pending in the application. Claims 25-46 stand rejected. Claims 25, 27, 28, 32, 35, 36, 37, 38, 39, and 46 are amended. No new matter has been

Drawings:

The drawings were objected to as containing reference characters not mentioned in the description. The description has been amended to mention the reference characters in question.

Specification and claim objections:

The typing mistakes pointed out by the examiner have been corrected.

35 U.S.C. § 112:

Claim 25 was rejected as incomplete on the ground that there were gaps between the steps. Claim 25 has been amended to eliminate the alleged gaps.

Various claims were rejected on the ground that terms recited lacked proper antecedent basis. It is believed that in many cases there was in fact inherent basis for the elements recited, but in the interests of speedy prosecution the claim language has been amended.

The examiner's stated rejection of claim 46 is not understood. "Structure, such as a plant" is a large apparatus. The "processing arrangement" of claim 38 is a small apparatus. A large apparatus can very easily be provided with a small apparatus to monitor a condition of the large apparatus. However, the wording of claim 46 has been emended to recite explicitly the relationship between the two parts of the combined apparatus.

35 U.S.C. § 101:

Claims 25 and 38 and claims dependent therefrom were rejected as not providing a concrete, useful, or tangible result. As suggested by the examiner, claims 25 and 38 have been amended to recite outputting the calculated integrity value so that the value can actually be used.

35 U.S.C § 103:

Claims 25-40 and 42-48 were rejected as obvious over U.S. Patent No. 4,480,480 (Scott) in view of EP 0 358 994 (Palusamy). The rejection is traversed. The cited references do not disclose or suggest, and the office action does not even allege that the cited references show or suggest, steps vi) and vii) of claim 25 or the corresponding features of claim 38.

Independent claims 25 and 38 are directed to a system and method for assessing structural integrity in which, first, the structure to be assessed is modeled, and the highly stressed areas are identified. At a later time, dimensions of the identified highly stressed areas are measured anew. The model is updated using the new measurements, and the integrity of the structure is calculated using the updated model.

Scott describes a system for assessing structural integrity by measuring angular deflections between the ends of one or more structural members. Scott detects either the gradual change in the elastic properties of the monitored member as cracks form, or the "seismic waves" (col. 11, lines 14-15) produced by the sudden release of strain energy (col. 12, line 30) when a crack first forms. To monitor the changes in the elastic properties, Scott initializes his system by measuring the actual deflections and vibrations under relatively controlled conditions (col. 11, lines 37-53). It is a fundamental limitation of Scott's system that, because Scott relies on measuring angular deflection along the length of a member, Scott can directly monitor only elongated members that bend or vibrate in use. Those members are typically not the highly stressed areas, because the very flexibility that makes them suitable for Scott to monitor prevents high stresses from arising.

Palusamy describes a system for assessing the structural integrity of a pipe in which a theoretical analysis is used to identify components most susceptible to corrosion-erosion (col. 2, line 52 to col. 3, line 5. Once the components to be inspected have been selected (col. 3, lines 12-13), the component is inspected using a rectangular grid (col. 3, lines 26-39).

Scott does not disclose creating a computer model of the structure, as required by applicant's claims 21 and 38. At most, Scott records and stores individual data relating to each monitored structural member. Scott does not analyze the structure using estimated load data to define areas which are subject to high stress. At most, the passages at col. 10, lines 14-23 and

col. 14, lines 35-46 cited in the office action describes real-time monitoring of an actual load in comparison to a design load (not an estimated load).

The examiner concedes that Scott does not teach re-measuring the dimensions in areas of high stress, updating a computer model, and re-analyzing the updated computer model. The examiner cites to Palusamy. However, Palusamy does not disclose or suggest the features missing from Scott. Palusamy at most describes modeling the system initially, to identify components (not areas) that are susceptible to high risk of corrosion/erosion. Once the susceptible components have been identified, the subsequent monitoring is carried out in the conventional way, by defining a regular grid of points and measuring the wall thickness at each point on the grid. Stress is not used as a criterion for the modeling or selection of susceptible components. It only appears at col. 5, lines 3-4, in assessing the instant integrity of a specific component. Even if the corroded components in col. 5 are highly stressed, the uncorroded components in cols. 2-4 were probably not highly stressed.

In addition, it is respectfully pointed out that the office action does not show that a person skilled in the art would, or even could, have combined Scott and Palusamy in such a way as to derive the applicant's invention. The examiner's stated motivation for modifying Scott is directed to a problem, and a solution to that problem, that arise only in Palusamy. Absent any showing that a similar problem arises in Scott, that the ordinary skilled person would recognize such a problem in Scott, there is no reason for the modification. Absent any showing that the modification would result in applicant's process and system, the modification, even if it were made, would not render the claimed invention obvious. In particular, neither Scott nor Palusamy mentions the idea of identifying areas of high stress and focusing the monitoring on those areas. Scott cannot do so, because of the nature of his measuring system. Palusamy is not interested in doing so, because his primary concern is areas of high corrosion / erosion.

For all of the above reasons, it is therefore believed that the present invention, as claimed in claims 25 and 38, would not have been obvious to a person of ordinary skill in the art having regard to Scott and Palusamy.

Claims 26-37, 39-40, and 42-48 are dependent from claims 25 and 38 and, without prejudice to their individual merits, are deemed patentable over the cited references for at least the same reasons as claims 25 and 38.

In addition, however, with reference to claim 28, as noted above, the cited passages of Scott do not in fact disclose or suggest updating and reanalyzing a model of the structure. They at most disclose continued monitoring of individual members.

With reference to claims 31 and 32, as noted above, the cited passages of Palusamy do not disclose installing sensors in high-stress areas. Stress will not even be considered until the output data from the sensors is assessed in col. 5.

With reference to claims 34 and 35, all of the cited passages from Scott appear to describe defects that occur during the monitored use of the structure, and not defects that are known prior to step iv). All of the cited passages from Palusamy refer either to "potential weak points," which are later clarified as areas "susceptible" to corrosion in subsequent use, or to corrosion that occurs in subsequent use, not existing defects and not defects that are known prior to step iv).

With reference to claims 35 and 36, in addition, none of the cited passages mentions the minimum size of defects. Indeed, there is only one point where any reference to the size of a defect can even be inferred, and there it is probably the largest defect arising in subsequent use.

With reference to claim 36, there is no mention in the cited passages of the precision of measuring equipment used.

With reference to claim 37, the cited references refer to monitoring the change in the monitored component over time, but do not disclose or suggest collecting a history **before step iv)**.

With reference to claim 43, it is respectfully pointed out that none of the cited passages actually discloses measuring fluid loading. Scott discloses only measuring present change in elasticity, for which past fluid loading may be one of the causes, and Palusamy discloses only measuring wall thickness, and then calculating wall loading, presumably using a value for fluid pressure from some unexplained other source.

For these reasons also, at least claims 28, 31-32, 34-37, and 43 are deemed patentable over the cited references.

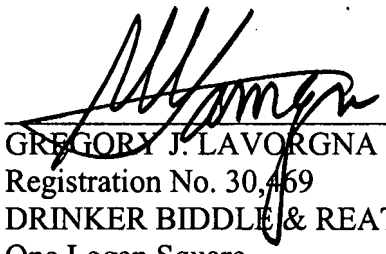
Claim 41 is rejected as obvious over Scott in view of Palusamy and further in view of U.S. Patent No. 5,867,97 (Zachary et al.) Claim 41 is dependent from claim 38, and Zachary is relied on only for the additional feature of claim 41. Without prejudice to its individual merits,

claim 41 is therefore deemed patentable over the combination of three references for at least the same reasons as claim 38 is patentable over Scott and Palusamy.

Conclusion:

In view of the foregoing, all of claims 25-48 are believed to be allowable. Applicant respectfully requests reconsideration and withdrawal of the examiner's objections and rejections, and allowance of claims 25-48. An early notice of allowance is respectfully solicited. If the Examiner believes, however, that direct communication would advance prosecution, the Examiner is invited to telephone Henry Blanco White, telephone no. 215-988-3301.

Respectfully submitted,



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